REMARKS

This application has been reviewed in light of the Office Action dated May 28, 2003. Claims 1-35 are pending in this application, with Claims 28-35 having been withdrawn. Claims 1, 9, 13, 14, 16, 18, 20-22, and 26 have been amended to define still more clearly what Applicant regards as his invention. Claims 1, 16, and 22 are the independent claims under consideration.

Figs. 13 and 14 have been labeled --Prior Art--, as required in the Office Action.

The Office Action also objected to Figs. 13 and 14 for including a bracket "apparently pointing to the device as a whole but no reference number is associated with the bracket." Fig. 13 shows a vertical type field emission type election-emitting device, and Fig. 14 shows a lateral type field emission type electron-emitting device. Since these brackets are not meant to include reference numbers, Applicant has not deleted these brackets. Should the Examiner require something further from Applicant in this regard, it is respectfully requested that he clarify the objection.

The specification has been amended to correct the informalities kindly pointed out by the Examiner at pages 2 and 3 of the Office Action.

Claims 1-8 and 22-25 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 5,973,444 to Xu et al. Claims 9, 10, 13-15, 26, and 27 were rejected under 35 U.S.C. § 103(a) as being obvious from U.S. Patent 5,847,495 to Yamanobe et al. in view of Xu et al; and Claims 11, 12, and 16-21, as being obvious from Yamanobe et al. and Xu et al. in view of U.S. Patent 5,066,883 to Yoshioka et al.

Claim 1 is directed to an electron-emitting device, including a fiber comprising carbon as a main ingredient. The device also includes a layer made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr, and Nb. The fiber comprising carbon as a main ingredient is disposed on the layer, and partially contains Pd.

One notable feature of Claim 1 is that a layer, on which a fiber comprising carbon as a main ingredient is disposed, is made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr, and Nb.

Xu et al., as understood by Applicant, relates to carbon fiber-based field emission devices. Electron field emission devices (cold cathodes) are discussed, as well as vacuum microelectronic devices and field emission displays which incorporate cold cathodes. More specifically, cold cathode devices comprising electron emitting structures grown directly onto a substrate material are discussed. Xu et al. also relates to patterned precursor substrates for use in fabricating field emission devices and methods of making the same, and to catalytically growing other electronic structures, such as films, cones, cylinders, pyramids or the like, directly onto substrates.

The carbon fiber emitters for field emission devices according to Xu et al. are catalytically grown onto a selected area of the device surface. The method of growing the carbon fibers is to heat the catalyst-containing surface in a gas environment containing hydrocarbons, carbon-containing compounds and/or carbon monoxide. In general, any transition metal that is a catalyst for the growth of carbon fibers is sufficient for the fabrication of carbon fiber emitters. (See column 7, lines 30-41.)

The fiber emitters can have a variety of structures and compositions. According to Xu et al., the fiber can contain portions of the catalyst; for example, the fiber may contain at least one transition metal or compound or alloy thereof. The transition metal compound may be Fe, Co, Ni, Cr, Mn, Mo, W, Re, Ru, Os, Rh, Ir, Pd, Pt, Zn, or Cu. (See column 9, lines 25-39.)

Nothing in Xu et al. teaches or suggests that a layer on which a fiber comprising carbon as a main ingredient is disposed, is made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr, and Nb. According to Claim 1, the fiber comprising carbon as a main ingredient contains Pd, and the fiber is disposed on the layer made of oxide semiconductor composed of material selected from the group consisting of Ti, Zr and Nb. Therefore, according to Claim 1, the material constituting the oxide semiconductor is different from the material contained in the fiber comprising carbon as a main ingredient.

On the other hand, according to Xu et al., a carbon fiber is disposed on a catalyst layer, and the carbon fiber contains a catalyst in the same case. According to Xu et al., the material constituting the layer on which the carbon fiber is disposed is the same as the material contained in the carbon fiber. Xu et al. does not disclose the features of Claim 1 that the fiber comprising carbon as a main ingredient contains Pd, and is disposed on the layer made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr and Nb.

By virtue of the features of Claim 1, since the semiconductor oxide is used as an underlying layer on which the carbon fiber is disposed, a desirable excellent adhesion of the semiconductor oxide to the carbon fiber can be provided. Furthermore, terminal

stability can be provided rather than a simple metal. The above advantages would contribute in suppressing terminal degrading due to heat generated during the driving of the electron-emitting device. Moreover, among the semiconductor oxides, the special semiconductor oxide comprising material selected from the group consisting of Ti, Zr and Nd is used. Such special semiconductor oxide is electron-conductive oxide. According to Claim 1, then, since the electron is emitted from the carbon fiber and since the layer on which the fiber is disposed is electron-conductive, the electron can be supplied stably to the carbon fiber. These special advantages are not taught or suggested by Xu et al.

Accordingly, Applicant respectfully submits that Claim 1 is patentable over Xu et al.

Independent Claim 22 includes the same features of a layer made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr, and Nb, wherein a fiber comprising carbon as a main ingredient is disposed on the layer, as discussed above in connection with Claim 1. Accordingly, Claim 22 is believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

Independent Claim 16 includes the same feature of a layer made of oxide semiconductor composed of a material selected from the group consisting of Ti, Zr, and Nb, as discussed above in connection with Claim 1, and, as explained above, nothing has been found in Xu et al. that would teach or suggest this feature. Nor has anything been found in Yamanobe et al. or Yoshioka et al., either alone or in combination, that would teach or suggest this feature. Accordingly, Claim 16 is believed to be patentable over Xu et al., Yamanobe et al., and Yoshioka et al., either alone or in any combination thereof (assuming such a combination to be permissible).

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

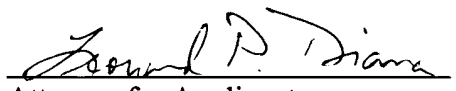
The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

An Information Disclosure Statement will be submitted shortly. Should the Examiner take up this case for further action before the Information Disclosure Statement is received, it is respectfully requested that he contact Applicant's undersigned attorney.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100 or by facsimile at (212) 218-2200. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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